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### (54) Motor vehicle control pedals and their mountings.

(57) With the aim of simplifying application of a control pedal to a vehicle the pedal (2), (4), (5) and a mounting (1) for it are assembled together as a pedal unit ready fitting to a vehicle, the unit being secured by the mounting (1) to a structural part of the vehicle for use. The pedal and mounting are made of plastics material as mouldings and may include some metal reinforcement. More than one pedal, eg. accelerator (2), clutch (4) and brake (5) pedals, may be assembled in the mounting 1. In a method of applying the pedal unit to a vehicle the vehicle has pre-positioned bolts or bolt holes at a fixing position on the structural part and pre-formed apertures (27), (28) in the mounting are registered with the bolt or bolt holes for the unit then to be bolted to the structural part at those registered parts.

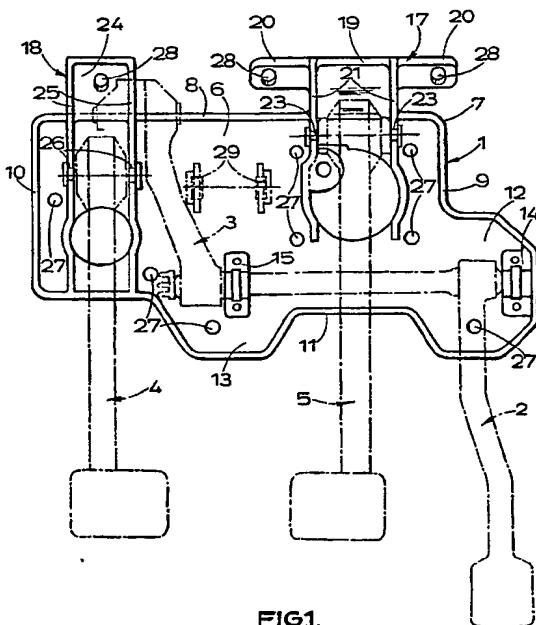


FIG1.

EP 0 430 600 A1

## IMPROVEMENTS RELATING TO MOTOR VEHICLE CONTROL PEDALS AND THEIR MOUNTINGS

This invention relates to motor vehicle control pedals and their mountings.

Conventionally motor vehicle control pedals such as accelerator, brake and clutch pedals have been made of metal and have been individually mounted in position in the vehicle by means of metal mounting brackets secured to the vehicle body, usually at the bulkhead. In general the metal used is steel and the mounting brackets have involved presswork, drilling and welding. The use of the metal pedals and mounting brackets has added to the weight of the vehicle, and the methods of manufacturing them and their assembly in the vehicle tend to be time consuming and relatively costly.

The present invention aims to avoid at least some of these known disadvantages.

According to a first aspect the present invention consists in a pedal unit comprising at least one motor vehicle control pedal and a mounting, both being mouldings of plastics material and assembled together ready for fitting of the unit to a motor vehicle, and the mounting having means whereby the unit is enabled to be secured by the mounting to a structural part of the vehicle for use.

The assembled pedal unit simplifies application of the control pedal to a vehicle. The mounting may have apertures, which may be holes and/or slots, by which it can be bolted in position on the structural part of the vehicle. Bolts or holes for bolts may be provided at fixed positions on the structural part by the vehicle manufacturer, and the mounting may have the apertures formed in it positioned ready to register with the bolts or holes at the structural part.

The pedal and mounting may be made entirely of plastics material or either one or both of them may include some metal reinforcement, which may be moulded into the item or be applied to it after moulding.

Manufacture from plastics material enables the weights of the components to be reduced. By suitable designing of the shapes of the components the plastics material in each of the mouldings can be kept to a minimum to provide the necessary operating strength and rigidity. Metal reinforcement has been mentioned but in addition, or alternatively, strengthening ribs and webs may be provided at or between sections of the components to keep down the bulk of the plastics material whilst enabling them to withstand satisfactorily stresses and strains to be incurred in use.

Integral formations may be included in the mouldings whereby the pedal is pivoted to the mounting. Alternatively separate means may be

applied to the components to provide the pivotal connection. For example a metal pivot may be applied which engages directly in holes or sockets in the plastics material in one or both of the components, or in one or more bushes or bearings of metal or other suitable bearing material such as, for example, nylon.

Where the pedal is an accelerator pedal it may have an associated actuator also made as a moulding of a plastics material. The actuator may be fast with a pivot of the pedal. Preferably the pivot is metal. It may be of a tubular form. At least at those parts engaged with the pedal and the actuator the pivot is preferably of a non-circular section to resist, or assist in resisting, relative angular movement of the pedal and actuator about the pivot.

The pedal unit may have two or more control pedals assembled with the mounting. All the control pedals required for a motor vehicle may be assembled with the mounting. It will be appreciated that having two or more of the control pedals assembled with just the one mounting can considerably ease the fitting of the pedals to a vehicle.

Alternatively the control pedals for a vehicle may be divided between pedal units in accordance with the first aspect of the invention. Such units may be arranged to be individually fitted and secured on a vehicle, or they may be adapted to be interconnected together and then applied as a composite fitting to a vehicle.

A suitable plastics material for the mouldings is a glass-filled nylon. Other plastics materials may possibly be used.

According to a second aspect the invention consists in a method of applying a control pedal to a motor vehicle comprising the steps of forming the pedal and a mounting therefor and assembling them together as a pre-assembled pedal unit having the pedal pivoted to the mounting, securing the unit by the mounting to a structural part of the motor vehicle and operatively connecting the pedal to pedal-controlled means of the vehicle which it is to operate.

According to a third aspect the invention consists in a method of applying two or more control pedals to a motor vehicle comprising the steps of forming the pedals and two or more mountings therefor, assembling at least one of the pedals with each of the mountings to form two or more pre-assembled pedal units having the pedals pivoted to the mountings, interconnecting the units together as a composite fitting, securing the fitting by the mountings to a structural part of the motor vehicle and operatively connecting the pedals to pedal-controlled means of the vehicle which they are to

operate.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings in which,

Figure 1 is a front view of a pedal unit in accordance with the first aspect of the invention, control pedals being shown in phantom;

Figure 2 is a plan view of a mounting of the pedal unit;

Figure 3 is an enlarged front view, partly sectioned, of an accelerator pedal and actuator of the pedal unit;

Figure 4 is a side view of the actuator; and

Figures 5 & 6 are front and side views respectively of a clutch pedal of the pedal unit.

Referring to Figure 1 of the drawings, a pedal unit is shown which comprises a mounting 1, an accelerator pedal 2 and actuator 3, a clutch pedal 4 and a brake pedal 5. With the possible exception of the, brake pedal they are all made as plastics mouldings, preferably of a glass-filled nylon.

Mounting 1 is generally in the form of an open-fronted box having a flat back wall 6 and a continuous, forwardly-projecting, peripheral wall 7 forming a top wall 8, two side walls 9, 10 and a bottom wall 11. There is a first sideways and downward enlargement 12 at one side 9 of the mounting, and a second downward enlargement 13 at an intermediate part of the bottom. At the first enlargement 12 and also above the second enlargement 13 horizontally aligned anchorages 14 and 15 respectively are provided integrally with the back wall 6 for pivot bearings 16, 16', Figure 3, for the accelerator pedal 2. Near to the opposite sides of the mounting there are respectively a brake pedal location 17 and a clutch pedal location 18. The brake pedal location 17, which is in the upper part of the mounting 1 at a position intermediate the enlargements 12 and 13, comprises a forwardly and upwardly inclined extension 19 of the top wall 8 which has lateral flanges 20 and parallel gussets 21 extending down from the extension 19 and joined to the top wall 8 and back wall 6. The gussets 21 extend more than half-way down the back wall. Towards the fronts of the gussets 21 in their upper parts are co-axial pivot holes 23 for the brake pedal 5. The clutch pedal location 18 extends through the depth of the mounting from the top wall 8 to the bottom wall 11. It also comprises a forwardly and upwardly inclined extension 24 of the top wall which extends appreciably further forwards than the extension 19 at the brake pedal location, and parallel gussets 25 joined to the top wall 8, back wall 6 and bottom wall 11. The front edges of the gussets 25 are stepped rearwards as they extend downwards. Co-axial pivot holes 26 for the clutch pedal 4 are formed in the larger upper portion of the gussets 25.

Fixing holes 27 are formed in the back wall 6,

and there are fixing slots 28 in the flanges 20 of the brake pedal location 17 and in the extension 24 of the clutch pedal location 18, for securing the mounting 1 in position when the unit is installed in a vehicle for use.

As an optional extra, a pair of brackets 29, Figure 1, may be formed integrally on the back wall 6 for the pivoting of a cruise control, not shown, in the mounting between the brake pedal and clutch pedal locations.

The accelerator pedal 2 comprises, as shown in Figure 3, a main, slightly cranked, lever portion 30 having a boss portion 31 at its upper end and an enlarged foot pad portion 32 at its lower end.

15 The lever 30 is of U-section, the base of the U being at the front of the lever, and has criss-crossed reinforcing webs 33 in its hollow extending between the side limbs of the U and also joined to the base of the U. The associated actuator 3 similarly has a cranked, but shorter, lever portion 34 with upper and lower boss portions 35, 36 at its upper and lower ends respectively. Between the bosses 35, 36 the lever 34 is arched, as can be seen from Figure 4. In this case the lever 34 is of I-section with an intermediate reinforcing longitudinal rib 37 and criss-crossed reinforcing ribs 38 at each side of the web of the I.

Both the accelerator pedal 2 and the actuator 3 are fixed on a tubular pivot pin 39 at enlarged hexagonal sections 40, 41 respectively so that they are restrained from rotation relative to the pivot pin. A first hexagonal section 40 is near to but spaced from one end of the pivot pin and is engaged as a tight push fit in a complementary hole 42 in the boss 31 of the accelerator pedal. A second hexagonal section 41 engages as a tight push fit in a complementary socket 43 in the boss 36 at the lower end of the actuator lever 34. Retaining pins 44 fix the respective bosses securely to the pivot pin 39 at the hexagonal sections.

40 The pivot bearings 16, 16' for the accelerator pedal are attached to round section portions of the pivot pin 39 respectively outwardly of the first hexagonal section 40 and inwardly of the second hexagonal portion 41. The pivot pin 39 is rotatable in the bearings 16, 16' which are fixed, as by rivets or bolts, to the anchorages 14, 15 on the mounting to locate the accelerator pedal and actuator pivotally in the mounting. A thrust washer 47 is fitted on the pivot pin 39 between the bearing 16' and the adjacent lower boss 36 of the actuator.

45 At its upper boss 35 the actuator has a peg 48 fixed which carries, retained by a split pin 49 and washer 50, a pressed metal attachment 51 for the connection of a throttle cable to the actuator when the pedal unit is installed for use, and a helical return torsion spring 52 which acts on the lever 34 of the actuator and on the mounting 1 to urge the

actuator and accelerator pedal 2 to a normal inoperative position.

Clutch pedal 4 comprises a lever portion 53 which, as shown in Figure 6, is cranked rearwardly from an upper end portion 54 formed with a boss 53 to its lower end portion 56 which is formed with an enlarged foot pad portion 57. For the most part the lever 53 is of I-section, which reduces in depth towards its lower end portion, with reinforcing ribs 58 at each side of the web of the I. The lower end portion 56 is of inverted U-section. The foot pad portion 53 is generally tabular with a rearward peripheral flange 59 and reinforcing transverse ribs 60 at the back. A through hole 61 in the boss 55 is lined by a steel bush 62.

The clutch pedal 4 is pivoted in the clutch pedal location 18 of the mounting between the parallel gussets 25. A bolt 63 serving as a pivot pin engaged in the pivot holes 26 of the gussets 25 and passing through the bush 62 in the boss 55 of the clutch pedal provides the pivotal connection to the location, being secured by a lock nut 64. Thrust washers 65 are fitted on the bolt 63 between the boss 55 and the gussets, and bearing bushes 66 are fitted on the bolt outside the gussets adjacent the head 63 of the bolt and the lock nut 64.

In the rear of the lever 53 of the clutch pedal, at the angle where the lever is cranked rearwards from the upper end portion 54, there is a further steel bush 67 which provides an attachment point for the piston 68 of a clutch operating cylinder 69 to be operated by the clutch pedal when the pedal unit is mounted for use in a vehicle. At the angle below that where the lever is angled forward again a nylon bearing 70 is located in the rear of the lever 53. A helical return torsion spring 71 engaged with that bearing 70 reacts on the mounting to cause the clutch pedal normally to be urged to an inoperative position.

The bush 62 at the boss 55, and the bush 67 and bearing 70 at the lever 53 may be incorporated into the clutch pedal as it is moulded.

The brake pedal 5 may be of similar form to the clutch pedal 4, and be similarly pivoted between the gussets 21 of the brake pedal location 17 and connected to a brake operating cylinder, and similarly spring urged to an inoperative position. Alternatively the brake pedal may be made of metal, or it may be made partially of metal and partially of plastics. For example in the latter form the brake pedal may comprise a metal pressing, which may be of relatively light gauge sheet, overmoulded with plastics material, preferably a glass-filled nylon, to the required finished form.

The pedals, their springs and the actuator 3 are all assembled in the mounting 1 so that the pedal unit is complete before it is fitted to a motor vehicle for use. It is then a relatively easy matter to apply

the unit to a vehicle and fix it in position by bolting the mounting to its support at the fixing holes 27 and slots 28.

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## Claims

1. A pedal unit comprising at least one motor vehicle control pedal (2; 4; 5) and characterised in that there is a mounting (1), the pedal (2; 4; 5) and mounting (1) are both mouldings of plastics material, the pedal (2; 4; 5) and mounting (1) are assembled together ready for fitting of the unit to a motor vehicle, and the mounting (1) has means (27, 28) whereby the unit is enabled to be secured by the mounting (1) to a structural part of the vehicle for use.
2. A pedal unit according to claim 1 characterised in that at least one of the pedal (2; 4; 5) and the mounting (1) includes metal reinforcements.
3. A pedal unit according to claim 1 or claim 2 characterised in that the mouldings have integral formations whereby the pedal (2; 4; 5) is pivoted to the mounting (1).
4. A pedal unit according to claim 1 or claim 2 characterised in that the mouldings have applied elements (39, 16, 16'; 62, 63, 66) by means of which the pedal (2; 4; 5) is pivoted to the mounting (1).
5. A pedal unit according to any preceding claim characterised in that the pedal (2) has an associated actuator (3) also made as a moulding of plastics material and fast with a pivot (39) of the pedal.
6. A pedal unit according to any preceding claim characterised in that the mounting (1) is generally in the form of an open-fronted box having a back wall (6) and a continuous peripheral wall (7) projecting forwardly from the back wall (6).
7. A pedal unit according to claim 6 as dependent from claim 4 characterised in that the back wall (6) has anchorages (14, 15) formed integrally with it to which a pivot (39) of the pedal (2) is retained.
8. A pedal unit according to claim 6 as dependent from claim 4 characterised in that the mounting (1) has formed integrally with it a pair of spaced gussets (21; 25) joined to the back wall (6) and peripheral wall (7) between and to which gussets (21; 25) the pedal (4; 5) is pivoted.
9. A pedal unit according to any of claims 6 to 8 characterised in that the peripheral wall (7) has an extension (19; 24) at which a fixing aperture (28) is provided for the purpose of securing the mounting (1) to the structural part of the vehicle.
10. A pedal unit according to claim 9 characterised in that there is a plurality of the control pedals (2; 4; 5) assembled with the mounting (1).
11. A method of applying a control pedal (2; 4; 5)

to a motor vehicle characterised in that it comprises the steps of forming the pedal (2; 4; 5) and mounting (1) therefor, assembling the pedal (2; 4; 5) and mounting (1) together as a pre-assembled pedal unit having the pedal (2; 4; 5) pivoted to the mounting (1), securing the unit by the mounting (1) to a structural part of the motor vehicle and operatively connecting the pedal (2; 4; 5) to pedal-controlled means of the vehicle which it is to operate.

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12. A method according to claim 11 characterised in that it includes the further steps of providing bolts or holes for bolts at a fixing position on the structural part of the motor vehicle before the pedal unit is brought to the structural part, pre-forming apertures (27, 28) in the mounting (1) at positions intended to enable the apertures (27, 28) to register with the bolts or holes at the fixing position on the structural part, applying the unit to the structural part at the fixing position with the apertures (27, 28) of the mounting (1) in register with the bolts or holes at the fixing position and fixing the unit to the structural part by bolting the unit to the structural part at the registered bolts or holes and apertures (27, 28).

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13. A method according to claim 11 or claim 12 characterised in that there is a plurality of pedals (2; 4; 5) assembled with the mounting (1) in the pre-assembled pedal unit.

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14. A method of applying two or more control pedals (2; 4; 5) to a motor vehicle characterised in that it comprises the steps of forming the pedals (2; 4; 5) and two or more mountings (1) therefor, assembling at least one of the pedals (2; 4; 5) with each of the mountings (1) to form two or more pre-assembled pedal units having the pedals (2; 4; 5) pivoted to the mountings (1), interconnecting the units together as a composite fitting, securing the fitting by the mountings (1) to a structural part of the motor vehicle and operatively connecting the pedals (2; 4; 5) to pedal-controlled means of the vehicle which they are to operate.

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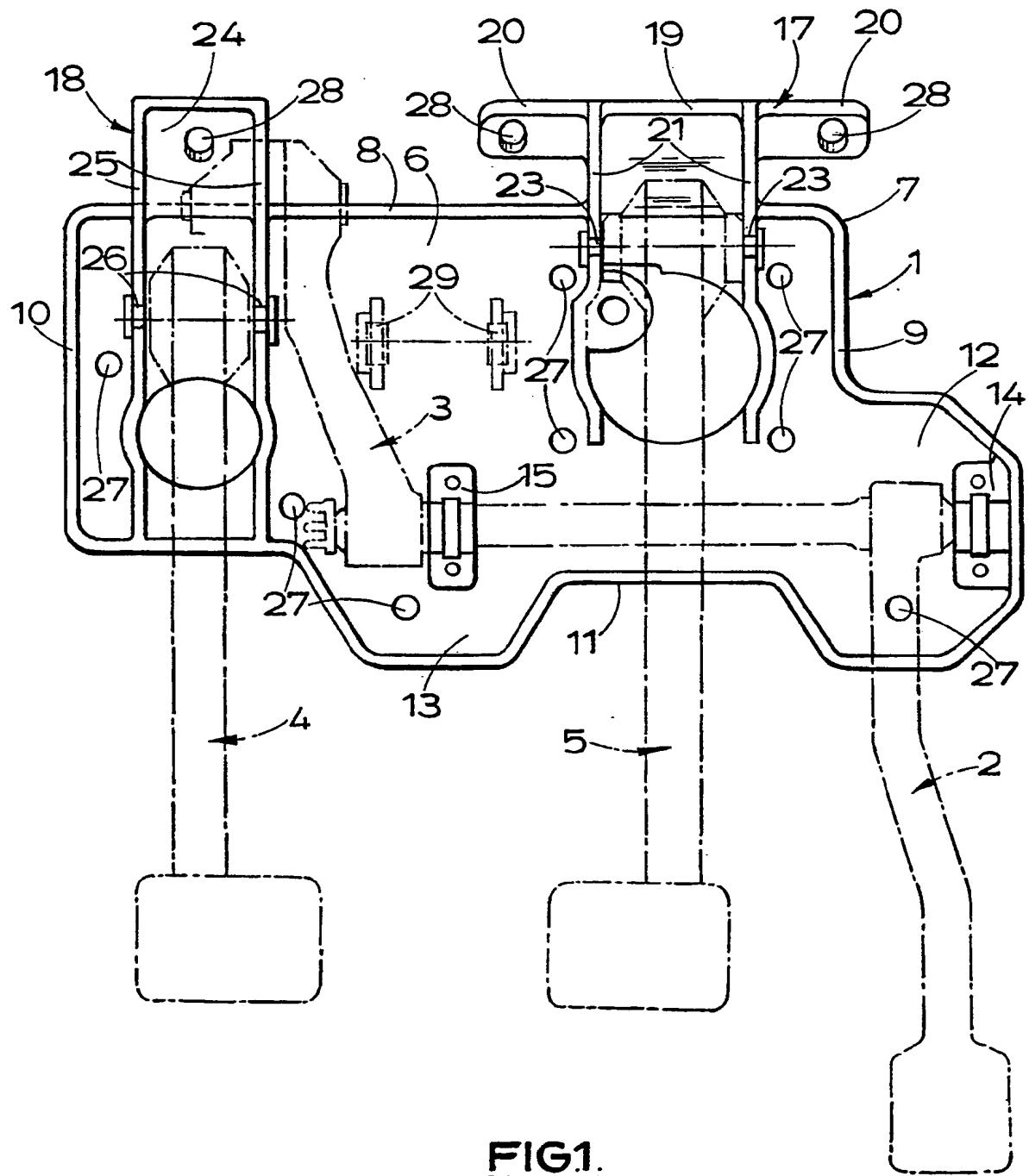


FIG1.

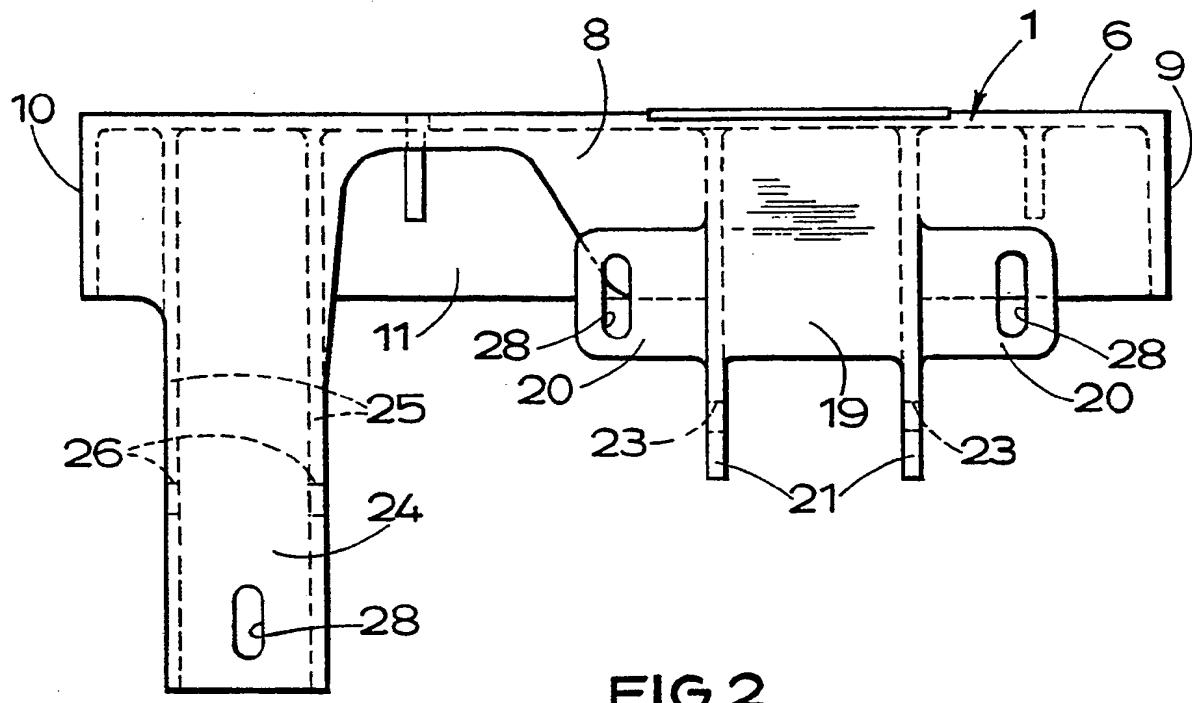
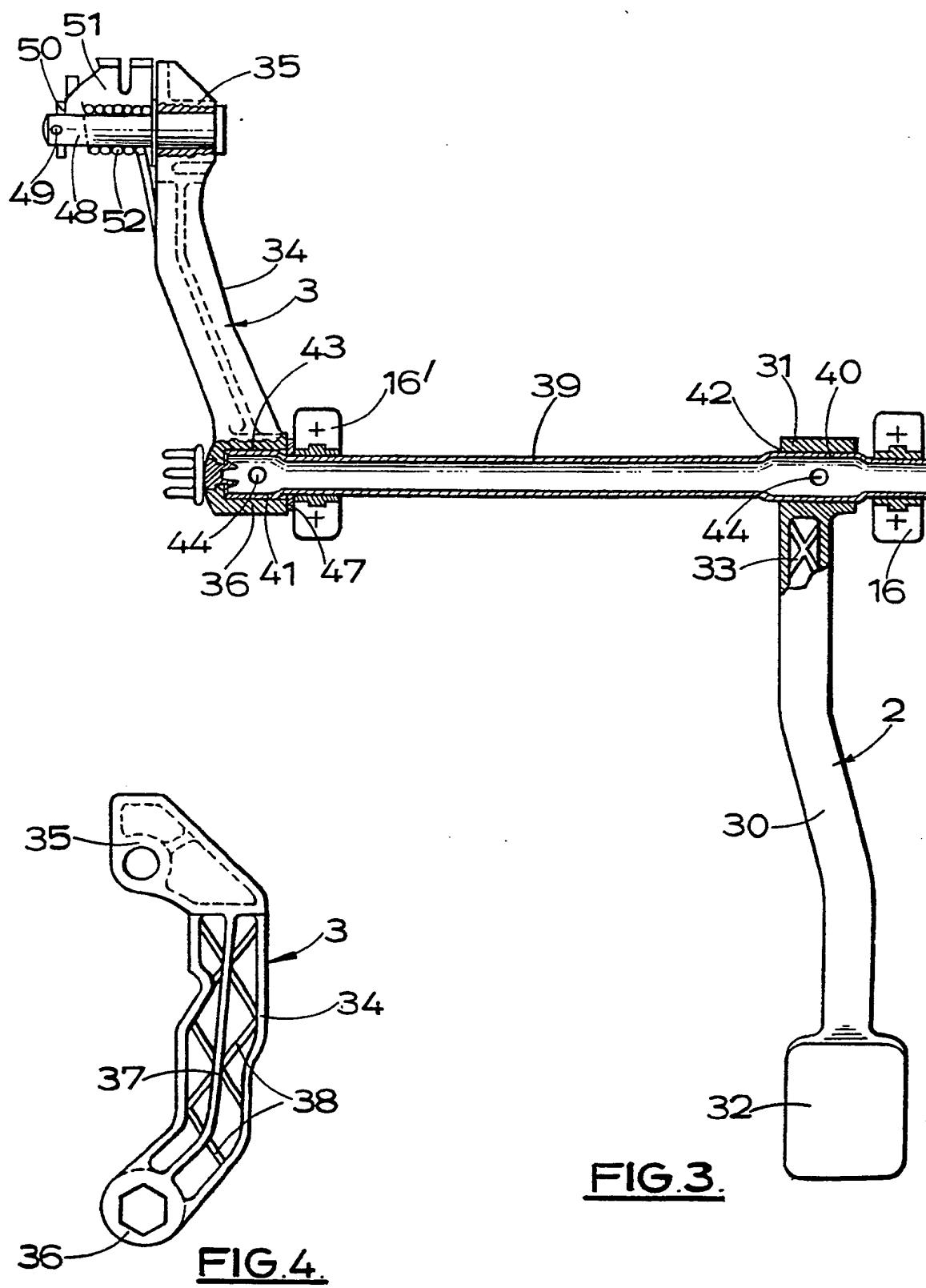
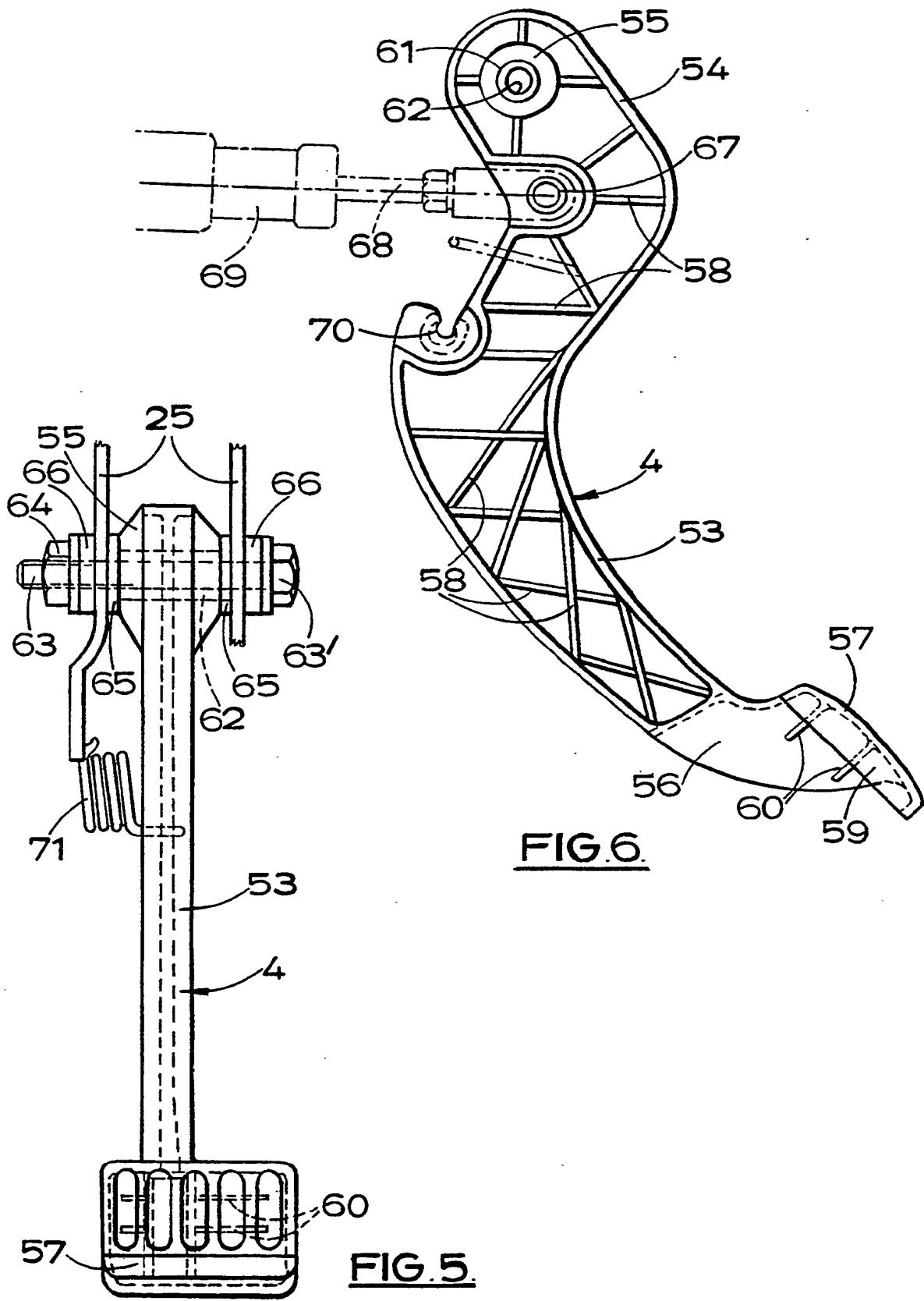


FIG. 2.







European Patent  
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## EUROPEAN SEARCH REPORT

Application Number

EP 90 31 2772

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-A-3001274 (SAAB-SCANIA) * page 2, paragraph 5 - page 3, paragraph 1; figure 2 *	11-13	G05G1/14
Y	---	1-4, 10	
A	---	7, 8	
Y	DE-A-2237623 (MONTAPLAST) * page 3; figures 1-3 *	1-4, 10	
A	---	11-12	
A	DE-A-3427097 (GERCKEN) * abstract; figure 1 *	1	
A	DE-U-8614205 (SAUERMANN JR.) * pages 5 - 6; figures 1-2 *	1-2, 4	
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			<b>TECHNICAL FIELDS SEARCHED (Int. Cl.5)</b>
			G05G B60K B60T
<p>The present search report has been drawn up for all claims</p>			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	26 FEBRUARY 1991	FLODSTROEM J. B.	
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